and the theory of liquid jets. In describing some of the later work stimulated by Volterra's contributions, he remarks that his notion of the composition of functions led, by way of Hadamard's reformulation of Huygens's principle, to Hille's creation of the theory of operator semigroups.

The book is very readably written; the author clearly admires Volterra deeply as a mathematician and as a person. In particular, it is clear that he is especially interested in the work on mathematical ecology. There is a brief bibliography at the end, making no attempt at completeness, but mentioning a selection of the more important books and papers by and about Volterra.

HISTORY OF ANALYSIS. Edited by R. J. Stanton and R. O. Wells, Jr. Houston, Texas (Rice University), 1977. Rice University Studies, Volume 64, Numbers 2 and 3. iii + 228 pp. No price stated.

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This double issue of the *Rice University Studies* contains four papers, which constitute the Proceedings of a conference on the history of analysis held at the University in 1977. I shall comment on each paper in turn, and then on the Proceedings as a whole.

F. E. Browder discusses "Mathematics and Society--A Historical View" (pp. 1-9). It is a short and rather vague summary of the impact of mathematics on society and on the profession of mathematics. There are few specific judgments, and two are certainly wrong: that the École Polytéchnique system was "not soon imitated elsewhere" after its foundation (p.7), and that Humboldt's founding of Berlin University began "the creation of the modern university system" (p.8; but there is no unique "modern university system"). The history of analysis is not discussed.

S. Bochner's account of "The emergence of analysis in the Renaissance and after" (pp. 11-56) is largely organized by themes: functions, real numbers, space, infinity, and continuity. Thus the chronology is rather jerky; and the focus of the article is further blurred by Bochner's failure to characterize what he means by "analysis" anyway. This is particularly noticeable on page 19, where Lagrange is contrasted with Cauchy, but the algebraic analysis of the former is not compared with the mathematical analysis

of the latter. Much of Bochner's information seems drawn from secondary sources; for example, on page 20 he reports two of them, assigning the origins of the conception of a function as a mapping to Dirichlet and Cournot, respectively, but in fact the notion really goes back to Lacroix. There is welcome emphasis on the bearing of mathematics on art in the Renaissance period, but no mention of the *liber abaci* traditions.

T. Hawkins' "The Creation of the Theory of Group Characters" (pp. 51-71) is the only paper by a historian of mathematics. It is a useful piece of scholarship on a specific matter, using the recently discovered correspondence between Frobenius and Dedekind in the period 1895-1898. On one point of scholarship, however, it is wanting: the manuscripts are quoted *only* in Hawkins' translation.

G. W. Mackey's "Harmonic analysis as the exploitation of symmetry" (pp. 73-228) dominates the Proceedings. As Mackey makes quite clear on p. 74, his essay is not really history of mathematics, but a series of formal analyses of past developments from the point of view of the modern understanding of harmonic analysis. One of the most remarkable of recent developments in mathematics is the extent to which harmonic analysis now permeates the subject, and Mackey's paper is a most useful and indeed authoritative account of the current perception of the situation. By nature of the exercise, the historical context of the paper is rather summary or even distorted. I have no objection at all to formal analyses of this kind--indeed, it is a good way to do mathematical research--but I suspect that even the purposes of formal analysis could be well served by attention to strictly historical questions; for example, to analyze *why* opportunities were missed, more than to mention *that* they were. My only reservation about the paper as it stands is that the bibliography at the end is *very* sparse; I doubt that "interested readers should have no difficulty tracking down those [references] that interest him" (p. 227) if the reader, though interested, is not well versed in the subject. In other words, the paper is difficult to work from.

One cannot expect the Proceedings of a meeting to form a coherent whole, even if the theme is fairly specific; but this volume on "History of Analysis" is the oddest collection that I have ever seen. A brief essay of no specific relevance to the theme is followed by a quasi-historical overview, a detailed historical account on one matter, and a long article which is explicitly stated not to be particularly historical!